Working Paper

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Strengthening Selected Educational
Institutions in N.W.F.P.

A Programmed Unit on Some Aspects of Learning

by

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This material has been produced to act as a focus for a discussion on programming material and not as a definitive work in the Theory of Learning.

I would like to have people's views on whether it is of any use for the above purpose and also some suggestions on how it might be improved in content, style, accuracy, up-to-datedness and so on.

T.L.M.

9 Aug 80

SOME ASPECTS OF LEARNING

1. Before we can get at the concept of 'learning', there are a variety of other words, and hence other concepts, that we need to know. How about 'behaviour', 'knowledge', 'intelligence' and 'thinking' for example?

"General knowledge is intelligence". If you agree that this is a true statement go to frame 2. If you think the statement is false go to frame 3.

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2. Educationists use general knowledge in the sense of intelligence so you were right to agree. 'Gneral knowledge' as used in everyday language is rather different.

Knowledge is of two kinds. We have mentioned general knowledge. The other is ______________. Think of a response, then go to frame 4.

* * *

3. In everyday usage, general knowledge is taken as knowing a lot of facts about the world and depends on being widely read and having a good memory. Many people we think of as intelligent have terrible memories in this sense. In educational theory intelligence is equated to general knowledge.

Knowledge is of two kinds. One is general, the other is ___________. Think of a response and then go to frame 4.

* * *

4. Knowledge is either general or specific. Specificknowledge refers to the information a person has about some topic. General knowledge is the ability to use the specific knowledge we have in a competent way.

To a layman, 'general knowledge' means 'a lot of specific knowledge' but we will not be using it in that sense.

General knowledge, or the ability to make good use of specific knowledge, is intelligence. Go to frame 5.

* * *

5. How about this statement? "Thinking is intelligence in action".

If you agree, go to frame 6; if you disagree frame 7.

* *

6. Intelligence in action is thinking so you were correct. How about this statement though? "When you are thinking, you are learning". If you think this is true go to frame 8; if false to frame 9.

* *

7. You are incorrect. Intelligence in action is thinking. Try this statement. "When you are thinking, you are learning". If you think this is true go to frame 8; if false to frame 9.

* *

8. It is possible to think without learning. Otherwise how did you end up in this frame? Go to frame 9.

* *

9. There is a considerable difference between thinking and learning. It is possible to think without learning but you cannot learn without thinking.

Think about this. "Behaviour is good or bad, or at least acceptable or unacceptable". If you agree, go to frame 10; if not go to frame 11.

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10. You thought wrongly so now learn! Behaviour in the educational sense has no moral values. Behaviour is a reaction. It is what an organism like us does in response to a stimulus. Go to frame 12.

* *

11. Behaviour in the educational sense has no moral values. Behaviour as you seem to suspect is an action. It is what an organism like us does in response to a stimulus. Go to frame 12.

* *

12. One stimulus can trigger of a variety of responses. A teacher will wish to encourage one response at the expense of others.

a. Learning is picking out the correct response.

b. Learning is changing behaviour.

. Picking out the correct response is a behaviour. Developing the skill to pick out the correct response is learning. Go to frame 14.

* * *

14. Learning is a change in behaviour. You should now be clear in your mind about the terms and concepts knowledge (general and specific), intelligenc thinking, behaviour and learning. If not, return to frame 1 and make sure you can get the right path through the programme. When you are sure of the material go to frame 15.

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15. "Given appropriate instruction anyone can be taught a given skill or conce If you agree, go to frame 16; if not, frame 16.

* * *

16. There are restraints on what a person is capable of learning which no amount of teaching technique will overcome. Very young children cannot be toilet trained, for example, because the appropriate neural links hav not been formed. You are also aware of mentally-handicapped children cannot learn because of a physical disability in the brain. Also, of course, a physically-handicapped child cannot be taught certain psychomotor skills. Go to frame 17.

* * *

7. Young children, mentally-handicapped and physically-handicapped children cannot learn what older or more fortunate children can. [illegible]

There are two types of restraint. One is the absence of certain neural links in the system. There is a physical barrier which just cannot be overcome. Can you think what the other type of restraint is ? Go to frame 18

18. The other type of restraint concerns the environment which surrounds the learner. Perhaps you wanted to say a mental barrier. If so, what kind did you have in mind? One kind would be caused by a physical weakness in the brain. We have already accommadated that. The other mental barrier would be from a psychological disturbance. This would be from the environment. Go to frame 19.

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19. "A child brought up in a complex stimulating environment will be more intelligent than a child brought up in a simple, non-stimulating one." If you agree go to frame 20; if not to frame 21.

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20. If we were to take two identical children in terms of potential, the one in the complex stimulating environment would outstrip his unfortunate friend. Not only that, but the gap would widen over the years.

How can this imbalance be minimised? Go to frame 22, after thinking of an answer.

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21. If the two children had identical potential, the one in the simple non-stimulating environment will fall behind steadily in achievemnt. This child will not be able to catch up with his more fortunate friend and it is fair to say will be less intelligent than his friend. He would lose the opportunity to learn skills and concepts when he was most receptive. The imbalance can be reduced but how? Go to frame 22.

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22. Every child has to have the advantage of a complex, stimulating environment (or perhaps every child has to have the disadvantage of a simple, non-stimulating atmosphere?) You may care to consider how to bring home to parents who were themselves disadvantaged in this sense the need for stimulation of the young child. In most cases little c

be done about the imbalance until children enter school. Then teachers have the prime responsibility to see that every child is stimulated by every possible means. A child in a complex home atmosphere with books, toys, games, radio, television, newspapers, magazines, photographs and articulate educated parents will still have a great advantage in the academic world over a child from a simple home. But the school has to minimise this. Go to frame 23.

* * *

23. We have seen that a school has to create the best possible environment for learning. How does a child react with the environment? What is the mechanism through which we interact with the external world? Go to frame 24.

* * *

24. We get the information from our receptors. These are our senses. The central nervous system carries this information to our effectors which take appropriate action, in the light of previous experience.

Our brains do four things. Do you know what they are? Try and list them before looking at frame 25.

* * *

25. The brain looks after:

a. our state of alertness (reticular formation)

b. our organic needs (hypothalmic activity)

c. our emotions (limbic system)

d. our intellect (the cortex).

Let us concentrate on the cortex. Is it fully developed at birth or does it grow in some way as we get older (and wiser)? If you think it is fully formed at birth go to frame 26; if not, to frame 27

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26. The cortex is not fully developed at birth. The basic material is there ready to be connected up with the neural links but these neural links develop gradually over the years. Can you think why this is so? Go to frame 28.

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27. You are correct but have a look at frame 26.

* *

28. Every new machine needs to be run in if it is to work well and long. Too great and sudden an input into an empty brain is liable to overload the system and cause a breakdown then or later. If the neural links are made gently with plenty of time for adjustment to new inputs the more chance there is of a stable efficient system.

The result, of course, is a slow development of a child's intellectual abilities and limits the tasks he can be expected to tackle.

This view that too many neural links too soon can cause organic problems is supported by the short lives of the majority of child prodigies. This fate is shared by those who physically grow very fast. Giants also have a short life in general. Go to frame 29.

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29. "Man is much smarter now than he was in the past". "Our children know much more than we did at their age". If you support both these statements go to frame 30. If you disagree with one or the other go to frame 31.

* *

30. In general, both statements have some truth in them. More and more discoveries are made at an ever increasing rate in this world of ours. Topics that used to be handled at Universities are now everyday problems for schoolchildren. Conversely some skills have been lost and in some areas there is a feeling that educational standards have in fact fallen.

Be that as it may, the trend is definitely to more intelligent people.

a. Is this because our brains are larger than those of our forefathers or

b. is it because the mass of discoveries and inventions forces us to live in a complex world.

If you think (a) go to frame 32; if (b), frame 33.

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31. Both statements are debatable but each has some truth. Man gets new ideas and learns more complicated skills every day. We like to think that we are a bit smarter than our ancestors were. Also, although we tend to criticise the education of our children, more and more material keeps slipping down from the Universities and Colleges into our secondary and primary schools. The trend is to higher intelligence. If you think that this is because our brains have grown larger over the years, perhaps by natural selection, go to frame 32. If you think there is some other reason go to frame 33.

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32. Our brains have not altered appreciably for tens of thousands of years. In any case, the weight and volume of our brains does not correlate well with our intellectual abilities. Go to frame 33.

* * *

33. Although our brains are relatively unchanged, the world they have to cope with is highly complex. We are bombarded by stimuli to an extent undreamed off a few years ago. It can only be the environment that forces us to develop a greater number of neural links than in the past. And makes us smarter - and our children smarter than us. Go to frame 34.

* * *

34. Every child develops at a different rate and reaches milestones at different times. This is true within a single culture. How about children from other cultures? Will that have any efffect on the rate of development? If you think 'yes' go to frame 35; if 'no' to frame 36.

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35. The children in a particular culture are unique in three areas; psychologically, intellectually, physically. In each of these three areas, they are usually markedly different from children in any other culture. In some areas, there may be vast distances in which cultural change is small. In other areas, cultural changes can occur in a few miles.

All over the world, children are more alike than they are different but we need to be careful of what we mean by that. Go to frame 37.

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36. Go to frame 35.

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37. Schooling has to deal with children as if they have a great deal in common. Can we impose a school system so that all children at a specified age can be expected to acquire the same body of knowledge? If you think 'yes' go to frame 38; if 'no', to frame 39

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38. Such a system can be imposed but it will not work. There are too many variables. Go to frame 39.

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39. There can be no body of knowledge that children of a certain age ought to know. Every child is an individual and so education (as opposed to schooling) has to deal with individuals. Since education and schooling are not the same thing, can we have schooling without education? If you think we can go to frame 40. If you think we cannot, go to frame 41.

* * *

40. I hope not but maybe you know something that I dont! Go to frame 42.

* * *

41. You are an optimist but I hope you are right. Go to frame 42.

* * *

42. Can we have education without schooling? If you think 'yes' go to frame 43; if 'no' to frame 44.

* * *

43. Perhaps, but there are some restrictions surely. Think of some before going to frame 45.

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44. In some societies schools are rare or non-existent. In almost all societies some children do not enter the school system. All children learn some things so education has taken place without schooling. You might also consider pre-school children who learn a great deal in the first few years of their lives. Go to frame 45.

* * *

45. Education takes place in school and out of school. It is fair to say that a great many people learn more outside school than they do in - which often is just as well! However, it is hard to imagine a modern society without schools. It is only in a simple society where the duties of each adult are clear cut and certain that an individual can be educated through daily activities of increasing responsibility. Is there any-one in a modern complex society who can avoid going to school and yet become a functioning citizen of that society? Think before going to frame 46.

* * *

46. The cases are rather extreme and involve those people who lack mobility in a social/economic sense. A poor farmer in a remote area may consider he can teach his son all he need to know to work his land. A mother may feel that she can train her daughter in all the required duties of a housewife and mother. An absolute ruler can have his son trained to take over the realm without going near a school.

Education need not be in a formal school setting but it usually is. Go to frame 47.

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47. We are concentrating on education in schools with professionally trained teachers. Think on this. "Our behaviour in a given situation does not change. We are pretty consistent"". If you agree, go to frame 48; if not, to frame 49.

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48. There are situations in which our behavious does not change. We are not learning anything. Hopefully we know it all already. In other situations our behavious does change over a period of time and we are learning.

Much of our learning takes place by trial and error. Faced by a choice of actions we prefer one to another. We read books by lots of authors but gradually we come to like some authors more than others.

As we learn more of the world and the people who live in it, our tastes change and we come to like other authors. Go to frame 50.

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49. A change in behaviour is learning. So if there is no change in behaviour we are not learning. Go to frame 48.

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50. There is a law called the Law of Effect. It says that an act is altered by its consequences. Is this consistent with the statement that "as a result of experience some tendencies get stronger and some get weaker"? If you think so go to frame 51; if not, to frame 52

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51. There is no inconsistency. We learn when we change our actions in the light of experience. As a person plays more tennis, he hits the ball with more accuracy (this tendency increases) and with less errors(this tendency decreases). Go to frame 53.

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52. The words differ but the sentiments are in accord. Go to frame 51.

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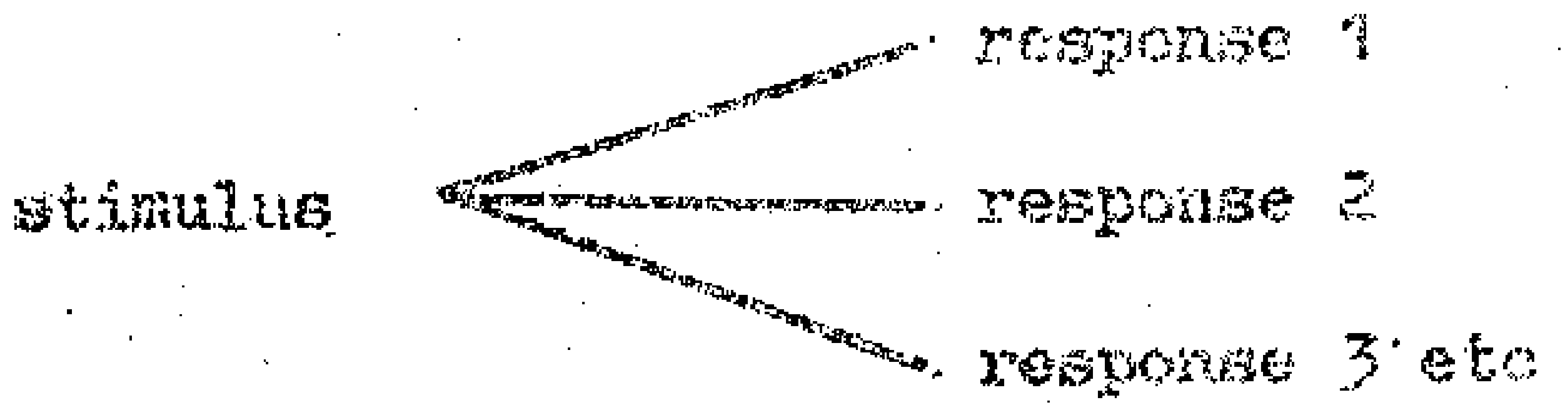
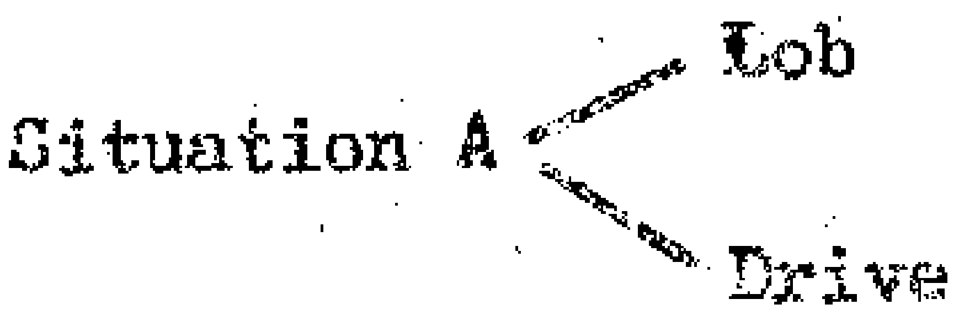
53. If our learning is good, the tendencies which get stronger should be the correct responses, and those tendencies which get weaker should be the incorrect responses. The basic structure might be shown like:



At different times, we get different responses until we tend to favour a particular response to this stimulus. We will have ordered our responses along a dimension from preferred to unpreferred. Hopefully this will be the same as from correct to incorrect. The one that we learn to prefer should be the one that our teacher has decided is correct. Think of the tennis analogy again.



If I lob when I should drive, my coach has teaching to do and I have still to learn.

Suppose under stress, a person smokes. Was that learned? If you think so, go to frame 54; if not, to frame 55.

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54. You are correct. Smoking under stress is learned. Go to frame 55.

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55. The stimulus "stress" causes the response "smoke". The person has learned that this is the correct response from such other possibilities as 'suck a sweet', 'take deep breaths', 'drink some water', 'take a tranquilliser', 'look for a new job'. It is the preferred response. Bad habits can be learned as well as good ones, sometimes better. Go to frame 56.

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56. If the person is in a non-smoking area, the next preferred response will be chosen and so on down the list. One category of responses are not learned, however. Do you know what they are called? Think then go to frame 57.

57. A response which is not learned is a form of reflex. It is an innate response. When we cross our legs and a doctor taps our knee our foot kicks out. That is an innate response. With a bright flash or a sudden blow of air our eyes close. These are not learned.

Again there is a difference in everyday language and in education. We have to modify reflex by saying it is an unconditioned reflex. It is the natural reflex we were born with.

Such uncoditioned reflexes have been commonly used to see how behaviour can be modified. A puff of air in your eye will make you blink. A buzzer is sounded just before the puff. The sequence is buzzer,puff,blink. At this stage the response is unconditioned. After several trials, the puff of air is omitted. What happens? Go to frame 58 after a bit of thought about the language needed.

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58. It is likely that the blink will follow the buzzer. In which case learning has taken place. The blink is now a conditioned reflex to the stimulus of the buzzer. The 'learner' has been 'conditioned' to 'blink' at the 'buzzer'. Will the learner blink for the rest of his life whenever he hears a buzzer? If you think so, go to frame 59; if not, go to frame 60.

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59. Over a period of time, the buzzer would lose its effect on the blink. The longer the exposure to the buzzer/puff sequence, the longer the wearing off would take. How can the conditioned response be maintained? Go to frame 61.

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60. You are right. It wears off. Go to frame 59.

* * *

61. Every so often the combined stimulus of the buzzer/puff has to be readministered. This process is called ________. If you think 'teaching' go to frame 62. If you think 'reinforcement' go to frame 63.

* * *

62. This is a specific teaching technique called reinforcement. It is part of teaching. Go to frame 64.

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63. You are correct but remember that reinforcement is an important part of teaching technique. Go to frame 64.

* * *

64. A response which gets positive reinforcement is more likely to be repeated than one which doesn't. At the other extreme, a response which gets negative reinforcement is less likely to be repeated. In a classroom situation where there is good rapport with the teacher this positive reinforcement could be as little as a nod from the teacher. If you agree go to frame 65; if not, go to frame 66.

* * *

65. You are right. Positive reinforcement can range from gentle approval to a substantial reward. In school such rewards might include displaying the work of a student, excusing the student some unliked and unimportant activity, allowing the student first choice of a book to read and so on. At home, a parent may buy a toy for a child doing some good work, or excuse a child from some chores for passing an examination.

If positive reinforcement is reward, what is negative reinforcement? Go to frame 68

* * *

66. Rewards do not need to be big and dramatic to reinforce a response. The teacher's faint approval may be enough. Can you think of ways to strengthen reinforcement? Go to frame 67.

67. The pupil's work might be displayed. The child might be given first choice of a reading book. A prize might be given – or a note of praise to carry to the parents. The pupil might be given some duties and privilege~~s~~s or excused some dull chores. ~~XXXXXXXXXXXX~~. If positive reinforcement is reward, what is negative reinforcement? Go to frame 68.

* * *

68. The opposite of reward is punishment. Again a wide range of activities are possible from the teacher's quiet disapproval to a beating or dismissal. Go to frame 69.

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69. "Homework is good because it reinforces the work done in the class". If you agree, go to frame 70; if you disagree, go to frame 71.

* * *

70. More work is being done. The weakness of homework is that there is no immediate reinforcement from the teacher, either positive or negative. Everyone is pleased with completing the task and being able to pursue other activities. By the time the work is discussed, much water has flown under the bridge.

The onus of reinforcement has altered to the parents. It is they who should check the work and give their rewards or punishments. Go to frame 72.

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71. You were right to disagree but go back to frame 70 to see the argument.

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72. Another technique for emphasising the desired response is to arrange for the desired response to be close to the next stimulus for that response. This is called contiguity. You ask a child, "What is 6 times 7?". The reply is '49'. At some poi~~n~~t in the lesson that child must be asked to respond '42'. The next time the stimulus, "What is 6 times 7?" is given he is better able to give the correct response of '42'. His last response to the stimulus was 42, so it is the most likely to be [illegible]

next time.

Take another example. A new class rush for the door as the bell sounds. This is an undesirable response. You call them back and dismiss them properly. Contiguity Theory will say that that they are more likely to await dismissal proprly the next time simply because it was what was done the last time in that situation. Was there reward or punishment present? If you think 'yes', go to frame 73; if not, go to grame 74.

* * *

73. Not necessarily. The teacher can be neutral, or jovial even. "Come on, let's try again." The next event might be one the pupils dislike. They may not be going to an enjoyable experience. They have learned by the contiguity of the stimulus and the desirable response; that is, by responding this time the way they did last time.

You can also see from this example, that a stimulus might be imbedded into a situation and we can say that in a particular situation a class can learn a desirable response. Go to frame 75.

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74. This was a better answer than the other but go back to frame 73.

* * *

75. In learning such as we have been considering there is a hierarchy of learning skills, the lowest of which is signal learning. One stimulus produces one response. The stimulus, "What is 3 an d 4?" will produce the response "7" in several ways. A child who knows the addition facts by rote is the one with signal learning. Think of another example of signal learning, then go to frame 76.

* * *

76. A possibility is "How many grams in three kilograms?". Signal learning has taken place if the response 3000 comes immediately. Higher learning may have taken place but if it was learned by rote it is signal learning.

The level above signal learning is chain learning. The learner has learned by chaining signals together. Can you think of an example that might need chain learning to solve it? Go to frame 77.

* *

77. How about, "Solve $3x + 2 = 14$.". Several routine steps have to follow on another and the method could have been learned by chain learning.

If a situation requires a decision to be made as to which path should be followed, we move up to a higher level of learning called multiple discrimination learning. Can you think of such examples? Go to frame 78.

* *

78. Sticking to mathematics examples, how about "Solve $x^2 + 7x + 8 = 0$."? There are several methods of solution and so the pupil has to decide which works best here. Since decisions were needed, the learning needed was multiple discrimination.

Would you agree that if you could solve the above quadratic equation that you "had the concept of solving quadratic equations"? If so, go to frame 79. If not, go to frame 80.

* *

79. This is a little bit of a catch question. The ability to solve quadratic equations requires lots of concepts and so the correct terminology is that the pupil knew the principle of solving quadratic equations. Go to frame 81.

* *

80. You are correct but read frame 79 for the explanation.

* *

. Principle learning consists of chaining concepts together - but what are concepts?

"A certain number multiplied by 2 is added to 5 and the result is 13. What is the number?" How many concepts are needed before you can solve this do you think? If you think 5 or less go to frame 82. If you think more than 5 go to frame 83

* *

82. More than five concepts are involved. Try making a list os some possible concepts involved in the problem. Go to frame 84.

* *

83. It is more than five. Make a list of all the concepts you think are involved in the problem. Go to frame 84.

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84. Some of the concepts involved are: number, certain number, equation, variable(pronumeral), multiplied, added, is(equals), linear equation, solve(solution), equivalent equations, balancing equations, additive inverse, multiplicative inverse. The actual list will depend on the method of solution adopted.

The concepts of the numbers 2, 5, 13, 4 and 8 will be needed along with some arithmetical skills such as 13 - 5 = 8 and 8 ÷ 2 = 4 or 2 x 4 = 8 and 5 + 8 = 13.

A person solving such problems consistently knows the principle of solving linear equations of the type $ax + b = c$, where x is a pronumeral and a, b and c are integers.

* *

5. "There are certain basic teaching techniques which improve the chances of teaching a concept to a group." If you agree go to frame 86; if not, to frame 87.

86. What steps would you take to teach the concept of a pyramid? Write them out then go to frame 88.

* * *

87. There are certain steps which have proved successful in teaching concepts. How would you try to teach the concept of a pyramid? Write down briefly the steps you would take then go to frame 88.

* * *

88. The recommended steps are:

a. Tell the group that they are going to learn what a pyramid is.
b. Show a pyramid and ask the pupils to describe it.
c. Show another pyramid and ask for its properties.
d. Continue until the common properties of all pyramids have been isolated out.
e. Show an obvious non-pyramid and find out how it is known not to be a pyramid.
f. Show a series of non-pyramids that look more and more like pyramids and get reasons for their rejection.
g. Get the pupils to sort out a mixture of pyramids and non-pyramids into the appropriate sets.
h. Try some real hard examples such as pyramids with their apexes not above the centre of the base
i. Get each pupil to describe a pyramid in his own words

The concept is established when a pupil can classify any object as a pyramid/non-pyramid. If you agree go to frame 89. If you disagree go to frame 90.

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89. The concept has still not been properly established. There is one more step. What is it? Go to frame 91

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90. The concept has not yet been established but what is missing? Go to frame 91.

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91. A concept to be properly established must be verbalised by the learner. A child who knows what a pyramid is ought to be able to define it in his own words. The definition need not be concise but it has to be precise. Concepts require language. Go to frame 92.

* *

92. Now that we have gone over the concept of a concept, we will recap a little. Learning theorists who concentrate on the stimulus/response aspects of learning are called connectionists. They are concerned that the correct or desirable responses to a given stimulus are strengthened and the incorrect or undesirable responses to that stimulus are weakened. They look at S-R set ups. Go to ~~frame~~ frame 93

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93. S-R can be replaced by S-O-R, where O represents the organism, us. Since what is actually happening in the brain is unknown, the connectionists pay little attention to the internal structures that can be theorised about. There is a form of psychology that concerns itself with the structure that people give to their experiences. This form of psychology is called ________________ Go to frame 94.

* *

. This type of study is Gestalt Psychology. Its concern is Field Theory. If you agree, go to frame 95; if not, to frame 96.

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5. Its concern is Field Theory or Cognitive Field Theory. Go to frame 97.

* *

6. It is concerned with Field Theory or Cognitive Field Theory. Go to

97. We are all aware of our life space and we organise our experiences in terms of this. A new experience may require us to alter this life space. Is this learning? If you think so, go to frame 98; if you think not, go to frame 99

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98. The restructuring of our life space is learning. Those who have studied Piaget will recall that assimilation occurs when an idea fits into an existing internal structure and accommodation occurs when a new idea causes a change in an existing structure to cope with this new idea.

Rather than just responding to a stimulus, attention is given to an entire personality functioning in a total environment. In our life space are certain goals and we learn when we get closer to these goals. Go to frame 100.

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9. It is learning. Go to frame 98.

* *

100. We seem to have two distinct theories of learning.

a. Learning is forming the correct response to a stimulus or situation

b. Learning is a perceptual change in a person.

The supporters of (a) are called connectionists and the supporters of (b) non-connectionists. If you agree with this go to frame 101; if you disagree, to frame 102.

* *

You are correct. Go to frame 103

* *

You are wrong. The statement is correct. Go to frame 103

103. In one system reinforcement is thought to be of major importance and in the other it has little weight. "Non-connectionists think that reinforcement is not so important in learning as other factors". If you agree go to frame 104; if not, go to frame 105.

* *

104. Xxxxxxxxxxx Reinforcement is thought of as quite a minor factor compared to a learner being aware that he is getting nearer to one of his life goals. Go to frame 106.

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105. The statement is correct. S-O-R supporters place a lot of emphasis on reinforcement as a learning aid. Go to xxx frame 104.

* *

106. There are two distinct ways of looking at learning. The issue is whether there are two ways of learning - or whether there is only one way of learning that we look at in two ways. When we take specific cases it usually seems that one or other explains the result best. Sometimes one theory holds good and sometimes the other. Many times both hold good! Go to frame 107

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107. One of the features of field theory, and an argument for its validity, is that it appreciates that in learning the result is often greater than anticipated by the instruction gives. The organism interprets situations in a way that S-O-R theorists find hard to explain.

A piece of music pleases us in a way that the individual notes and chords never can. It is how we perceive the whole that is important. S-O-R theory emphasises the elements; field theory the complete structure. If you agree, go to frame 108; if not, to frame 109.

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108. The concentration of S-O-R theories is on smaller portions than field theories. Go to frame 110.

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109. The emphasis of field theory is on large structures so the statement was correct and you were wrong. Go to frame 110.

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110. In frame 94 we talked of Gestalt Psychology. Another word you will find concerned in this theory is holistic.

Gestalt refers to an organised whole whose sum is greater than its parts and where every part affects and interacts with every other part. You can think of yourself in this way.

Holism is the theory that by creative evolution the whole organism functions in a way which is somehow superior to the combination of each individual part.

"In Gestalt theory, learning takes place slowly". If you agree, go to frame 111; if not, to frame 112.

* * *

111. In Gestalt theory real learning takes place in spurts of inspiration. The whole process may be slow but the best learning is when the learner gets a sudden insight into the situation and the solution is obvious, usually without any step by step analysis. Go to frame 113.

* * *

112. In a sense you could be correct but go to frame 111.

* * *

113. Learning in a school situation is normally firmly based on S-O-R views. The danger is that your objective is to explain a forest and the pupils see bark, leaves, branches, buds. What one thing can be always done to improve this situation? Go to frame 114.

* *

114. At all times, the pupils must be aware of your objectives and be faced with the largest possible view of the subject in hand. If the subject is forests, the forest must be there in front of the pupil or in the front of the pupil's mind, even when individual tgees are being looked at. When solving a particular equation, the type of equation should be kept in the pupils' attention.

For many people, the itty-bitty pieces stay as so many odds and ends. The teacher has to get them to fit the pieces into a coherent fund of knowledge. Go to frame 115.

* *

115. Those learners who are well taught and have a flair for the subject will find it easy to learn large amounts of work in a brief time as long as the teacher shows them the full breadth of the subject. Those who are given tiny portions of a subject to peer at, even if they have the flair, will find learning far harder than it ought to be. For those without the flair, a subject will always consist of unconnected and limited facts of little practical use. Go to frame 116.

* *

116. We will now shift our focus to four features of learning in a school. To show that something has been learned, a stimulus must be applied for the pupil to react to. Think about these stimuli: "Add 4 and 5." "what is 8 plus 7?" "40 people are on a bus and 12 more enter. How many passengers are now on the bus?" What is common to these? Think then go to frame 117

- - - - - - - - -

117. The pupil had to be able to add. The stimuli were different but the pupil had to extract a common element. This underlying demand made on a pupil is called what? What is the pupil given to let him know what is expected? What do the actors on a stage get when they have some action to perform? Go to frame 118.

* *

118. It is a cue. In each case the pupil has to pick up your cue.

"A cue must be simple and clear." If you agree go to frame 119; if not, to frame 120.

* *

119. A cue may be obvious or it may be well-hidden. It may be buried in a lot of 'noise' as in a word problem, but in any learning situation, the required response must be cued in some way. Slow children need simple cues, quick children can pick out a cue from a complex situation. Go to frame 121.

* *

120. A cue can be far from simple and it can be distinctly unclear. You are correct but go to frame 119.

* *

121. A cue can be strong or weak. Which is most likely to promote learning? If you think "strong", go to frame 122; if "weak", to frame 123.

* *

122. This is a catch question I am afraid. Neither response is correct. A strong cue will force an answer from a pupil but that is not learning is it? Go to frame 124.

* *

123. This is a catch question with both answers wrong. A wek cue will be unlikely to get any response. A strong cue wil. be likely to get an answer. Giving an answer is not learning. Go to frame 124.

124. A cue to be effective has to be strong enough to get a response from the learner. That response will show whether learning has taken place or not. So we give cues and these cues must have ______. Add a suitable word. Go to frame 125.

* *

125. A cue must have force (or strength). Will this force, in a specific case, be the same for all learners? If you think 'yes' go to frame 126; if 'no', to frame 127.

* *

126. You are wrong. A cue which has a lot of force for you might appear quite weak for me. A cue may arouse your interest and not mine, for example. Go to frame 128.

* *

127. That's right. We all react differently to the cues of our teachers. A cue may have a great deal of force for us but pass over the heads of our neighbours. Go to frame 128.

* *

128. A cue has been given so that the pupil knows what is expected of him. It has enough force to make the pupil respond. What the learner needs now is a clue to what he is expected to do. Think again of the stage. What is done if it is noticed that an actor is unsure of his next line or action? You ______ him. Think of the word and go to frame 129.

* *

129. You prompt him. In a learning situation, you issue instructions on how to tackle the work you are giving out. You make sure the work produced is in a form that pleases you - and eventually the examiners.

So we use cues with force and prompts. What is the fourth ingredient that a teacher needs to add? We are referring to ~~SR~~ S-O-R learning here. Go to frame 130.

130. You are trying to get into a position where the prompt is not needed. Constant prompting means that a part has not been learned and requires more practice. In a classroom, what has to be added to maintain the correct form of response is called reinforcement. Go to frame 131.

* * *

131. We reinforce good habits (the correct response) and try to eliminate bad habits (the wrong responses). A teacher needs many instructional skills but these are not being dealt with in this paper. However, can you think of the general types of learning that a teacher is trying to establish in the learners. Make a short list than go to frame 132.

* * *

132. Many times a teacher is telling something to the pupils or explaining some point. Certain skills are required to do this well.

At other times a teacher will wish his pupils to learn material for later recall from the pupil's memory. Again a battery of instructional skills is needed.

These are two from a list of four. You may have had a different classification in mind so have another look at your list and the two points above before passing to frame 133.

* * *

133. A teacher may have to develop psycho-motor skills in the learner to improve handwriting or the drawing of geometric figures. The teaching of these skills requires specialised techniques.

So this classification involves teaching for knowledge, for recall, for skills. An important "teaching for ________" is missing. What is it? It is not attitude, though that may be part of it, as it is of the above. Go to frame 134.

* * *

4. If any subject is well taught there will be a carry-over into other areas. What is this called? Go to frame 135.

* *

35. It is said of Mathematics, for example and whether true or not, that if it is well taught, the learner will be able to think clearly and reason well in a variety of other situations. The learning of Latin was thought to make the learning of any other language easier.

Such connections are called transfers. We teach for transfer.

Is transfer always positive, or can it be negative? If you think 'yes' go to frame 136; if 'no' go to frame 137.

* *

136. There are instances where hard work in one area can be bad for work in another area. A person learning to be a shot putter would be in poor shape for marathon running. Long practice on the bagpipes is likely to interfere with a career as a concert pianist. However, playing a flute is likely to transfer to a recorder. Go to frame 138

* *

137. Not all learning has possibilities for positive transfer. Look at frame 136 for some examples of possible negative transfer.

* *

138. "Peopbe who learn Mathematics well, reason better than people who dont". If you agree go to frame 139; if not, go to frame 140.

* *

139. Good mathematicians often reason very badly in everyday situations - and in fields like Politics and Economics. It is obvious that there is no automatic transfer of a faculty from one discipline to another. Can you think of some examples of underlying faculties that we may or may not have? Go to frame 140, after thinking.

* * *

140. You might have mentioned things like memory, intelligence, perseverance, verbal skill, energy, common sense, patience and such like. There is a Theory of Formal Discipline which says that faculties such as those above can be developed through certain techniques.

"Learning a long poem improves a pupil's memory". If you agree go to frame 141; if not go to 142.

* *

141. It is not universally true. In fact, memorisation often seems to get more difficult the more has to be memorised. Go to frame 143.

* *

142. Memorising long passages (of little interest) seems to tire most people. Being forced to memorise something may not help your memory. Go to frame 143.

* *

143. There is an extreme opposite theory; the Theory of Specific Learning. This says that learning is always specific. ~~Xmmxpxx~~ You learn what you learn - no more, no less. What do you think? Go to frame 144.

* *

144. Is there room for a middle view where transfer sometimes occurs (positive and negative) and sometimes doesn't? If you think 'yes' go to frame 145; if 'no', go to frame 146.

* *

145. Perhaps there is middle ground but what are the conditions under which positive transfer is likely? Go to frame 147.

* *

146. Transfer sometimes occurs and sometimes not. Can you think when positive transfer might be possible? Go to frame 147.

* *

147. The ability to fly a kite is unlikely to help a boy with his social studies but the ability to recite the multiplication tables will help a boy with his algebra. What is definitely needed for transfer? Go to frame 148.

* *

148. The situations have to have something in common. In other words, there are common components.

Does this disprove the Theory of Specific Learning? If you think it does, go to frame 149; if not, go to frame 150.

* *

149. The fact that a boy can learn two rather similar topics does not necessari mean that there has been transfer. He could have learned two specific but very similar skills. More information would be needed to come to any conclusion. Go to frame 151.

* *

150. You are correct but read frame 149.

* *

151. Sometimes two situations interfere with each other and learning then seems to cause difficulties. When does this seem to happen?

People trained to work one machine may find it very difficult to operate a new model of the same machine. Whgat has stayed constant and what has varied? Go to frame 152.

* *

152. Think in terms of stimulus/response. The stimulus is the same but the operator's response has to be different. Let's say that when the lever has to be turned clockwise on the old machine, it has to be turned anticlockwise on the new one. If you are used to driving on the left and you visit a country where they drive on the right, a correct response for your country could be a disaster in the foreign one. Can you now

put together some ideas on the transfer of learning. Take your time before going to frame 153.

* *

153. The amount of transfer from one situation to another depends on how much the two stimuli have in common. The question of whether the transfer will be positive or negative will depend on the similarity or difference of response required.

However, although this makes understanding of 'transfer' clearer it i still possible to argue that no transfer takes place. We learn thin more easily if we have already learned a lot about them.

Does this mean that a teacher can forget all about transfer and stick to teaching specific concepts? If you think so go to frame 154. If you think not go to frame 155.

* *

154. A teacher has to ensure that what is called "transfer" is used to help a learner. The similarities between the old and the new must be clearl pointed out to the learner. The widest possible applications and implications of the material being learned must be brought out so that the pupil can link it up with other work. Go to frame 156.

* *

155. A teacher cannot ignore what is called "transfer". Go to frame 154.

* *

156. The conclusion is inescapable. Teachers must teach for understaning of the material. If a topic is understood, new similar topics will be learned fast. You might call the happening transfer but you need not. Go to frame 157.

* *

157. Much learning is done these days by the use of programmes such as this. It is easy to write such a programme. If you agree, go to frame 158; if you disagree, to frame 159.

* *

158. It may be easy for you but I find it hard work. Go to frame 160.

* *

159. I agree with you, heartily. Go to frame 160.

* *

160. "Anyone can learn to write a programme." If "yes" go to frame 161; if 'no', to frame 162.

* *

161. A good classroom teacher ought to be able to make a reasonable first attempt at a programme. With practice, reading and a little help most good teachers can learn to write good programmes. Go to frame 163.

* *

162. Not everyone can write good programmes but read frame 161.

* *

163. The way to begin to write a programme is to take a piece of work you are familiar with, perhaps a short section of a book, and think how tou would actually teach it in the class. Some pieces need telling about - exposition. Ohher bits can be developed by asking formative questions. The lesson as a whole needs evaluating by summative questions. Put these together and you have your programme. Go to frame 164.

* *

64. By now, you should know what each small unit in a progmamme is called. What is it? Go to frame 165.

* *

That was a question like "How long did the Seven Year War last?" The answer was a frame, of course. Each frame consists of an explanation and a question, usually. The question is designed to separate those who have understood from those who haven't.

One type of programme is called linear. In a linear programme, you consistently go from one frame to the next.. That is not so here. This programme is ____________. Go to frame 166.

* *

The word we use is not non-linear but branching. A learner's response determines which parts of the programme he has to tackle. However, most branching programmes contain linear sections and unless the programme writer is very smart most of the branches are very short and soon lead back to the main highway. Go to frame 167.

* *

Well done, you've reached the last frame. As was said at the start, this covers some aspects of learning theories. The programme itself is unlikely to be consistent with a specific theory of learning - which is as it should be!

&*